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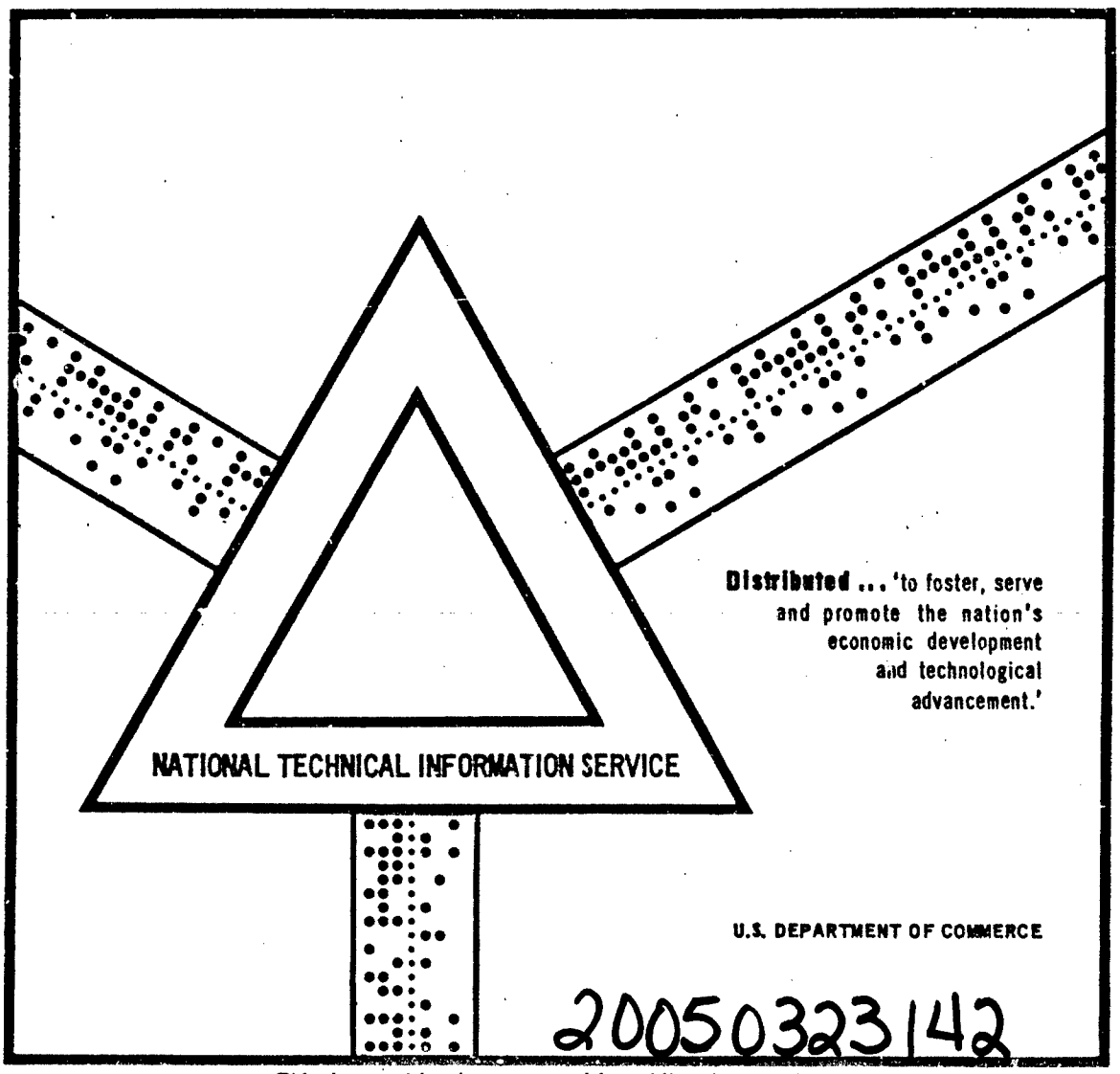
INFORMAL COMMUNICATION AMONG SCIENTISTS: A STUDY OF THE INFORMATION EXCHANGE GROUP PROGRAM. FINAL REPORT. PART 1

William F. Heenan, et al

George Washington University
Washington, D.C.

January 1971



INFORMAL COMMUNICATION AMONG SCIENTISTS

A Study of the Information Exchange Group Program

Final Report - Part I

January 1971

Prepared for:

U.S. Air Force Office of Scientific Research
Washington, D.C.

BIOLOGICAL SCIENCES COMMUNICATION PROJECT
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13. ABSTRACT

This report presents the results of a study of the Information Exchange Group Program sponsored by the National Institutes of Health during the period February 3, 1961 to February 1, 1967. In particular, the report contains a review of the experimental program - its objectives, its operation and its conclusion. Tables and analyses are presented to describe the membership of the seven Information Exchange Groups (IEG's) the scientific literature exchanged under the program and the data collected by NIH in examining the role of informal exchange in the conduct of scientific research. Membership questionnaires which provided the data for NIH surveys have been analyzed as the primary source of information on the results of the six-year experiment.

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FINAL REPORT

PART I

U.S. Air Force Office of Scientific Research

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A Study of the Information Exchange Group Program

by

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David C. Weeks

January 1971

Biological Sciences Communication Project
The George Washington University Medical Center
Department of Medical and Public Affairs

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This report presents the results of a study of the Information Exchange Group Program sponsored by the National Institutes of Health during the period February 3, 1961 to February 1, 1967. In particular, the report contains a review of the experimental program - its objectives, its operation and its conclusion. Tables and analyses are presented to describe the membership of the seven Information Exchange Groups (IEG's) the scientific literature exchanged under the program and the data collected by NIH in examining the role of informal exchange in the conduct of scientific research. Membership questionnaires which provided the data for NIH surveys have been analyzed as the primary source of information on the results of the six-year experiment.

CONTENTS

INFORMAL COMMUNICATION AMONG SCIENTISTS

From February 3, 1961 to February 1, 1967, the National Institutes of Health operated, on an experimental basis, a facility for rapid dissemination of unevaluated information. Designed and developed as a medium of scientist to scientist communication, it was intended to provide speedy, verbatim, professional communication, on a worldwide basis, between a researcher in a sharply circumscribed research area and all other scientists who were engaged in creditable research in the same area. The medium was called the Information Exchange Group (IEG) and the information communicated was called a "memo". The operating mechanism was quite simple. A researcher would mail his communication to NIH where it was duplicated by photo-offset at the NIH Office of Printing and Reproduction and then mailed to all other members of the researcher's IEG. There was no review, editing or abstracting. The material sent from NIH was a photographic copy of just what was submitted.

The legal basis on which the IEG program was established is found in Section 301, Public Law 410, 78th Congress as amended, commonly referred to as the Public Health Service Act.

Section 301 "The Surgeon General shall. . . (a) collect and make available through publications and other appropriate means, information as to, and the practical application of, such research and other activities. . .".

The IEG was considered "other appropriate means".

Initially, the declared purpose was to accelerate the progress of science. There can be little objection to so noble a purpose, particularly since informal communication was popularly conceived as occupying a major role in the development and transfer of knowledge. The mechanism was established and flourished for six years under NIH support. Its conclusion in 1967 must be regarded as premature so far as evidence of having increased the rate of progress in its selected areas of scientific research.

The experiment which began modestly with one Information Exchange Group IEG #1, resulted from conversations in late January 1961 when the idea was explored. The initiators of the experiment were Dr. Philip Handler, a biochemist at Duke University; Dr. David Green,

Director of the Enzyme Institute at the University of Wisconsin and Dr. Erratt C. Albritton of the Office of Research Accomplishments at NIH.

IEG #1 initially consisted of 32 scientists who were working in the field of electron transfer and oxidative phosphorylation. New members were added through nomination by existing members or by application. The conditions of membership (1) are listed:

1. Membership is limited to scientists actively engaged in the area.

2. The purpose of the IEG is to accelerate the progress of science by accelerating scientist-to-scientist communication in the research area covered by the exchange.

3. Members may transmit to the other members preprints of completed research papers, drafts of papers, memoranda of research findings not yet published, discussions of published or unpublished findings or any other original communication whatever.

4. The member recognizes an obligation to fellow members to participate in transmitting as well as receiving communications through the Exchange, but is the sole judge of what and when to transmit.

5. The member undertakes on his own behalf and on behalf of any other person with whom he shares the information that any research finding communicated via the Exchange will be treated as a "personal communication" from a professional colleague and will be given due credit as such in any situation where question of priority might arise.

A copy of these conditions was sent out with each invitation to the initial members and to all subsequent nominees and applicants approved as eligible for membership.

The growth curve for IEG #1, plotted on semi-log paper is seen in Figure 1(2). The number of members increased from the initial 32 to 224 by the end of the third year while the number of memos circulated increased from 14 for the first year to 143 for the third year.

After IEG #1, had been in operation for nearly three years, Dr. Green, its chairman, published an article in Science (3) which gave

the first public account of the IEG mechanism. The other six additional IEG's were organized in rapid succession following its appearance.

Information about the seven IEG's is presented in Table 1(4) which shows the research area of each IEG, date established, membership numbers and numbers of papers circulated.

The first step in the organization of an IEG was the selection of a Chairman (or co-charrman) who was usually a leading scientist or the leading scientist in the research area. It was he who selected a list of prospective members, invited them to join. In fact, he was the decision-maker on all matters having to do with his IEG. The sponsor (NIH) was there in the role of experimenter to observe and learn--learn just what contibution to the advance of medical science this mechanism of communication could make.

After the appearance of Green's article, the groups did grow rapidly so that by the close of the experiment, total membership had increased to 3,663 and the total number of memos ciruclated was 2,561. Figures 2-8(4) show cumulative totals of members and papers, while Figure 2-9(4) shows papers alone for the seven groups.

The international character of the seven groups is indicated in Table 2(4). The 3,663 members came from 46 countries, but 58% of the total came from the United States. According to Price (5) this is disproportionately large, owing probably to the fact that the groups were still in the process of spreading out to a fair coverage of all workers in the field.

As far as content of the memos ciruclated is concerned, there was complete freedom of communication within a group and as Green stated (6):

> "Communication could be anything a member chose to submit: a copy of a paper he had submitted for publication, a comment on another communication, a long paper or a short paper, a request for information, a review article, a protest against some indignity, even a sounding off about something or other."

However, an examination of the memos circulated by IEG #1, Dr. Green's group, showed that approximately 90% of all communications were preprints of papers which were eventually published, with or without change. This characteristic was an unfortunate one, for it gave to the IEG a character that clearly limited its role. Preprints can scarecly be regarded as informal communications even though the

FIGURE 1

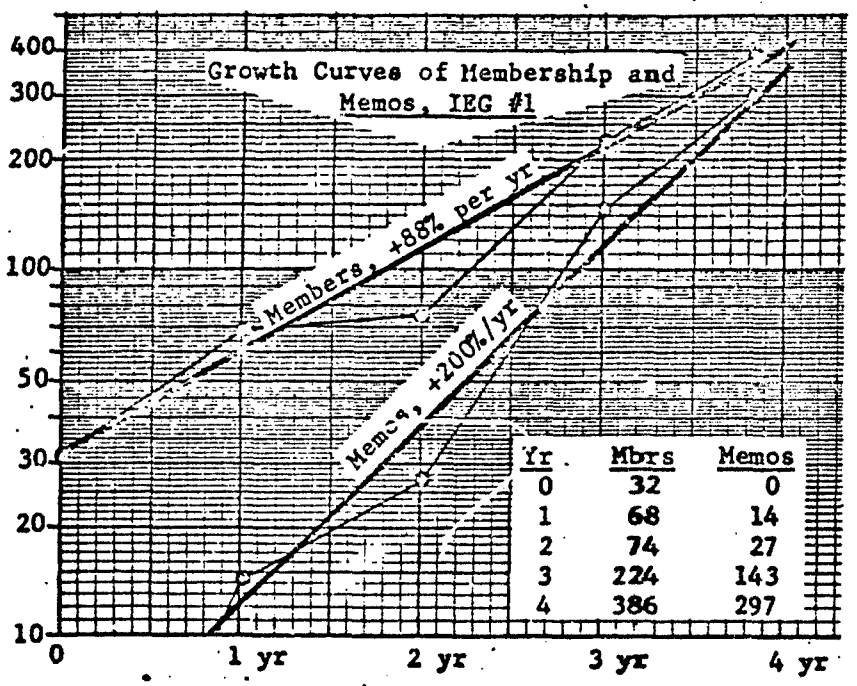


TABLE I

The Seven Information Exchange Groups

NAME	DATE ESTABLISHED	NUMBER OF MEMBERS (final)	NUMBER OF PAPERS CIRCULATED (final)
IEG #1 Oxidative Phosphorylation & Terminal Electron Transport	2/3/61	735	774
IEG #2 Hemostasis	3/1/62	127	176
IEG #3 Computer Simulation of Biological Systems	5/1/64	171	69
IEG #4 Molecular Basis of Muscle Contraction	10/15/64	297	141
IEG #5 Immunopathology	10/1/64	611	320
IEG #6 Interferon	11/15/64	250	275
IEG #7 Nucleic Acids & the Genetic Code	2/5/65	1,472	806

mechanism of dissemination was outside the normal publication cycle. Hence, Green's idea was never realized nor was its utility tested as originally envisioned.

In March 1965, Dr. Albritton estimated a cost per preprint of about $0.10. With costs given as of December 1965, based on membership of October 1965, he estimated a cost per preprint of about $0.50 and a per member cost close to $90.00 per year. See Table 3.

TABLE 3(4)

IEG Cost per Member and per Memo (Dec. 1965)

		Cost per Year	
	Total	Per Member	Per Memo
Memo printing, marking and postage, 336,808 copies	$122,964	$68.00	$0.37
Office Personnel	35,437	19.68	0.11
Other (travel, telephone, etc.)	2,350	1.30	0.01
Totals	$161,301	$88.98	$0.48

(1) 1,800 members at 10/15/65
(2) 336,808 copies/year based on 3 months count of memos

Projected cost estimates for the year ending 12/6/66 indicated a total cost to NIH of over $400,000 with a decrease in the cost per memo to $0.41.

Because the IEG's were an experiment, surveys were conducted in order to learn how members evaluated certain aspects of their membership experience. Initially, two surveys were conducted. Questionnaires were sent out to 50 leading scientist members of IEG #1 in December 1964 while in August 1965 a second questionnaire was sent to all members of IEG #6. The questions and replies are shown in Tables 4 and 5(4). The second questionnaire asked:

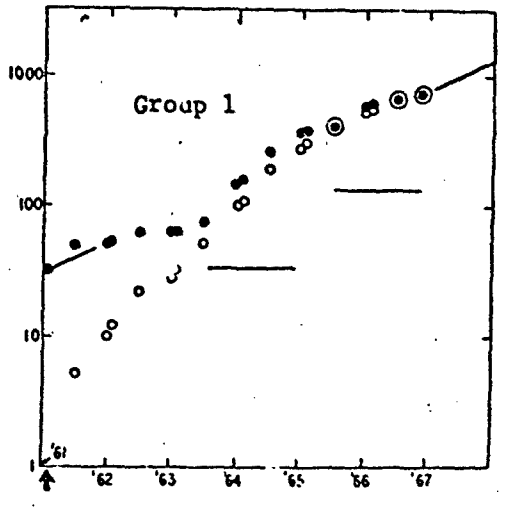
(1) Are you better informed on current developments?

(2) How much earlier is the information received?

(3) Is it easier to keep abreast of the literature?

Semi-log Graphs of Cumulative Totals of Members(0) and of Papers(0)

FIGURE 2



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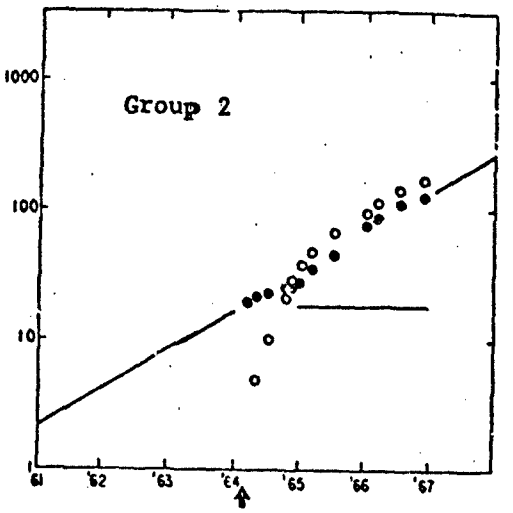

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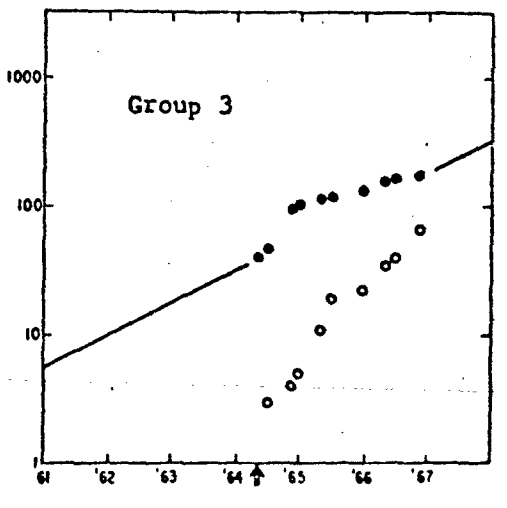

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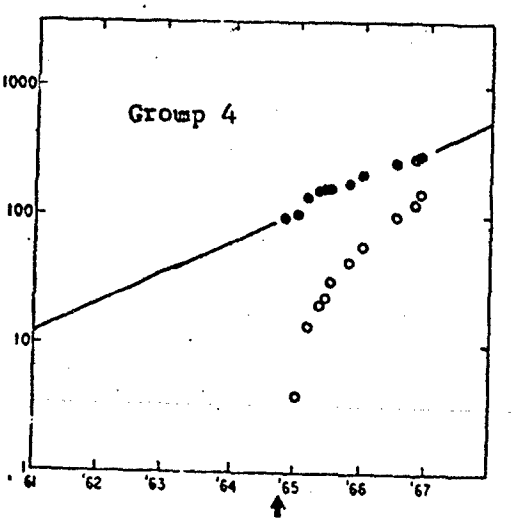
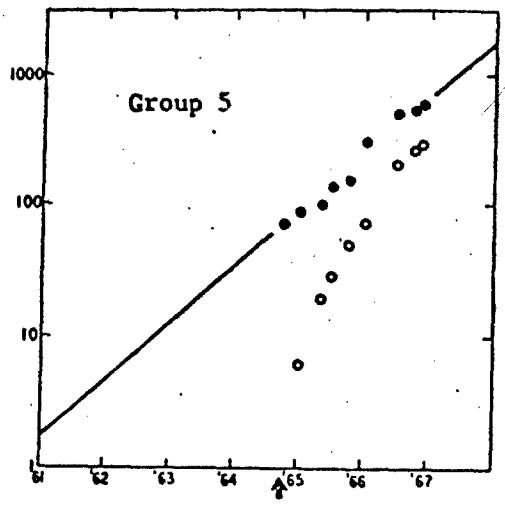


Membership Growth Factors and Doubling Times

Group #1 ...	1.69x,	per annum;	15.9 months
Group #2 ...	1.92x,	" "	12.8 "
Group #3 ...	1.69x,	" "	15.7 "
Group #4 ...	1.64x,	" "	16.7 "

FIGURE 6



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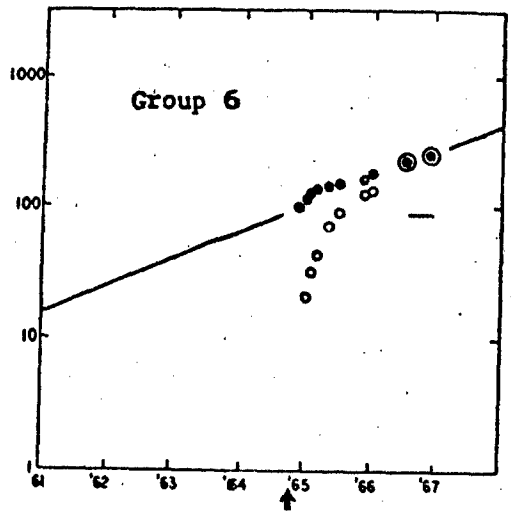

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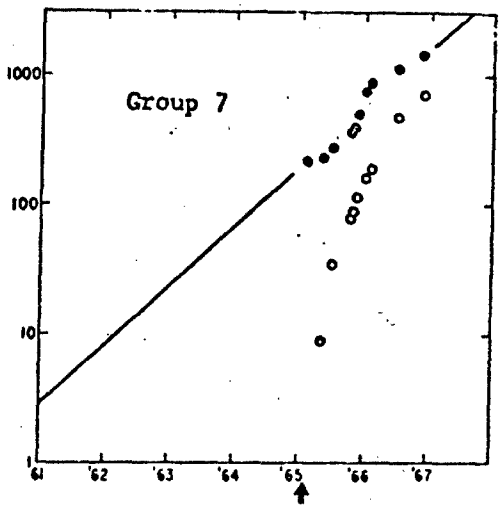

Membership Growth Factors and Doubling Times

Group #5 ... 2.42x, per annum; 9.4 months
Group #6 ... 1.53x, " " 19.6 "
Group #7 ... 2.58x, " " 8.8 "

FIGURE 9

Cumulative Totals of Research Papers in Each of the Seven Groups

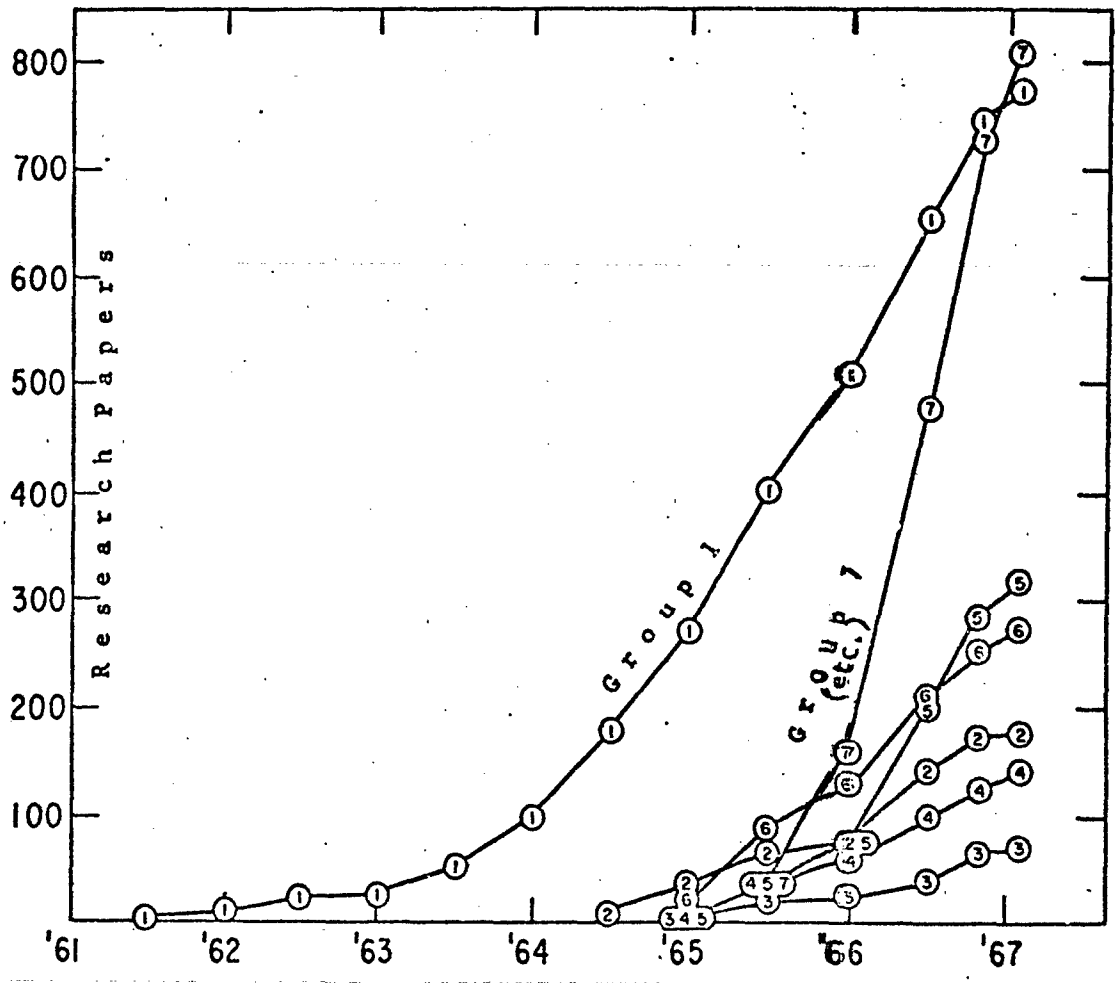

TABLE 2

Members of the Seven Groups by Country
(February 1, 1967)

Country	1	2	3	4	5	6	7	Total	Percent
Total Membership	735	127	171	297	611	250	1472	3663	100.00
United States	394	54	138	174	334	144	897	2129	58.12
England	74	18	14	31	55	22	114	328	9.00
Japan	44	1	-	13	7	12	56	133	3.63
Italy	32	2	1	2	19	4	54	115	3.14
France	29	1	-	7	25	8	42	112	3.06
Russia	16	2	-	16	21	10	36	101	2.76
Canada	17	4	5	6	12	11	31	86	2.35
Australia	22	6	2	5	25	3	20	83	2.27
Germany	18	6	2	7	7	3	25	68	1.86
Israel	8	-	-	2	10	2	31	53	1.45
Netherlands	15	2	2	1	21	-	10	51	1.39
Belgium	4	4	1	6	5	5	24	49	1.34
Sweden	15	1	-	2	17	5	7	47	1.28
Scotland	1	-	2	-	5	4	25	37	1.01
India	4	-	1	1	2	1	23	32	.87
Switzerland	4	2	-	1	13	3	9	32	.87
Czechoslovakia	4	1	-	3	7	9	5	29	.79
Poland	8	2	-	1	-	4	6	21	.57
Denmark	1	1	1	2	1	2	12	20	.55
Hungary	1	2	-	9	2	3	3	20	.55
Norway	5	10	-	-	2	-	2	19	.52
New Zealand	-	-	-	3	1	-	10	14	.38
Finland	3	-	-	-	3	4	-	10	.27
Brazil	2	1	-	1	1	-	4	9	.25
Mexico	1	-	-	-	2	1	5	9	.25
Yugoslavia	-	-	-	-	4	-	2	6	.16
Argentina	1	-	-	-	-	-	4	5	.14
Austria	1	-	-	-	2	1	1	5	.14
Spain	2	-	-	-	-	1	2	5	.14
Chile	-	-	1	-	-	-	3	4	.11

Country	1	2	3	4	5	6	7	Total	Percent
Nigeria	-	-	-	-	3	-	1	4	.11
Turkey	-	3	-	-	-	-	1	4	.11
Greece	-	1	-	-	-	-	1	3	.08
Ireland	1	-	-	1	-	-	1	3	.08
Philippines	-	-	-	-	1	1	-	2	.06
Romania	1	-	-	-	1	-	-	2	.06
Senegal	-	-	-	-	2	-	-	2	.06
Venezuela	-	-	-	1	-	-	-	2	.06
Bulgaria	-	-	-	-	-	-	1	1	.03
Congo	-	1	-	-	-	-	-	1	.03
Iran	1	-	-	-	-	-	-	1	.03
Pakistan	-	-	-	-	-	-	1	1	.03
Portugal	1	-	-	-	-	-	-	1	.03
So. Africa	-	1	-	-	-	-	-	1	.03
Uganda	-	-	-	-	-	-	1	1	.03
Zambia	1	-	-	-	-	-	-	1	.03
USA % in Each Group	53.6	42.5	80.7	58.6	54.7	57.6	60.5	58.12%	
Other countries % in Each Group	46.4	57.5	19.3	41.4	45.3	42.4	39.5	41.88%	

(4) Has the rate of progress in the field increased?

(5) If so, by what way or ways?

The results of these surveys are of questionable value since the questions lacked objectivity by revealing the expected direction of the reply. Also, the 50 members of IEG #1 probably did not constitute a random sample since "leading scientists" were queried.

Next a consideration of the place of the IEG's in the communication spectra, as initially envisioned by NIH, must be presented. In the IEG context journals were assigned an archival role with the editor given the task of maintaining the excellence of recorded scientific achievement. IEG's were considered to be speedier and to allow back and forth discussion. No competition was seen as existing between the two means. Memos were not considered publications--but personal communications since they were not subject to editorial revision; could not be "subscribed to"; were distributed exclusively (and without charge) to scientists working in the IEG's research area; were not sent to or accumulated by or indexed by libraries; were not abstracted in abstract journals, did not in any sense form part of recorded scientific achievement. Quoting from the cover used on all memos, the IEG was a "continuing international congress, by mail".

Now looking at the internal environment, that is group member feelings, views were expressed in January 1966, that IEG's were becoming financial threats to journals. Dr. Albritton (7) solicited views on this question from 39 IEG members who were editors or associate editors of leading journals. The majority opinion expressed by those questioned was that the IEG's posed no problem to journals. This is quite significant since it included the opinion of Dr. John Edsall, Editor of the prestigious Journal of Biological Chemistry, who was relaying the views of the Commission of Editors of Biochemical Journals of the International Union of Biochemistry.

Two other matters were being commented upon by several of the members. First, there were complaints of too many memos and although the number complaining was small, there were still complaints. Second, concern was expressed about the increasing lag time between the receipt of memos at the IEG office and the dispatch of copies to members.

In order to alleviate the 'too many memos' complaint, a few memos were sent out with abstracts printed on the cover. However, this procedure was never adopted as a standard operating procedure. Suggestions were also made about subdividing existing IEG's into two or more subareas. Lag time at NIH was becoming a problem and there were delays as long as two months which is just about equal to that of Science.

TABLE 4

Early Questionnaires: Dr. Green's

I. December 14, 1964
Questions submitted to 50 of the first members of Group #1 by its Chairman, David E. Green

Questions	43 Replies[1]		
	Answers	No.	%
(1) Has the IEG helped to make it easier for you to keep abreast of the current literature? Yes/No	Yes	42	98%
	Probably	0	
	Doubtful	0	
	No	1	2%
	Other	0	
	Answers	No.	%
(2) Do you think that the rate of progress in the field has been intensified by the more rapid dissemination of information? Yes/No	Yes	36	83%
	Probably	2	5%
	Doubtful	2	5%
	No	2	5%
	Other[2]	1	2%
	Answers	No.	%
(3) Are there any instances which you can cite in which an IEG memo saved you time that would have been lost if you had had to wait several months for the full paper to appear? Yes/No	Yes	35	81%
	Probably	0	
	Doubtful	0	
	No	6	14%
	Other[3]	2	5%

1/ The alternatives to a simple "Yes" and "No" were not in the questionnaire, but were constructed from reservations or other comments written in by those responding.
2/ "Activity, yes; progress?"
3/ "No in my case, but I think it frequently might."
"See attached letter."

TABLE 5

Early Questionnaires: Dr. Baron's

II. August 10, 1965
Questions submitted to all 150 members of Group #6 by its Co-Chairman, Samuel Baron

Questions	120 Replies		
	Answers	No.	%
(1) Are you better informed on the current developments in the field of interferon than you were before establishment of the exchange?	Much better informed	100	83%
	Somewhat better informed	20	17%
	No change	0	0
	Negative effect	0	0
(2) How much earlier on the average does information on interferon reach you via the exchange, as compared with previous sources of information?	More than 12 mo. earlier	6	5%
	6 to 12 months earlier	61	51%
	3 to 6 months earlier	48	40%
	1 to 3 months earlier	5	4%
	Same time	0	0
(3) Has the IEG helped to make it easier for you to keep abreast of current literature in the field of interferon?	Much easier	99	82%
	Somewhat easier	20	17%
	No change	1	1%
	More difficult	0	0
(4) Do you think that the rate of progress in the field has been increased by the more rapid dissemination of information?	Greatly intensified	38	32%
	Somewhat intensified	78	64%
	No change	4	3%
	Negative effect	0	0
(5) If you think that the exchange has increased the rate of progress, in which of the following ways has most of the increase come about for you? (Check as many answers as needed).	Prevented unnecessary cuplication of research	58	48%
	Suggested new leads earlier than would have occurred through journals	68	57%
	Made available useful information which would not have appeared elsewhere	53	44%
	Provided an opportunity for the author to receive valuable comments on a manuscript before publication	15	12%
	Other	5	4%

Turning next to the external environment, in May 1966, Simon Pasternack, a Ph.D. physicist and editor of The Physical Review, published an article "Is Journal Publication Obsolescent?" in Physics Today (8). He expreseed the opinion that orderly communication through journals might be jeopardized by a developing national information system which he felt was beginning to encroach on the domain of the primary publication system. At the same time he spoke out against a proposed Physics Information Exchange (PIE). The PIE to be established in the area of theoretical High-Energy Physics was essentially a centralized preprint exchange. Pasternack was of the opinion that mass distribution of unedited, unreferred and often unproofread preprints would put journals out of business or transform them into depositories.

This article in Physics Today was followed by another (9) the following month which presented a debate on the proposed experimental preprint exchange. The system as outlined by Michael Moravsek, the head of the elementary particle and nuclear theory group at Lawrence Radiation Laboratory, was to be based on the establishment of many local preprint libraries. After preprints were sent by scientists to the central PIE office they would be duplicated and copies then dispatched to the local libraries. Moravsek defined preprint as any duplicated scientific communication, whether intended for publication in that form or not. He argued for the PIE because of its speed, selectivity in distribution and generally because he felt the present system of administering preprints was costly, time consuming and haphazard.

Pasternack continued his stand against the PIE. He defined a duplicated scientific communication as a document and reserved preprint to denote a duplicated manuscript that had been or was about to be submitted for publication in a regular journal. He argued that PIE would constitute publication because of the wide distribution and that any similarity between the proposed PIE and IEG was misleading because the IEG's dealt with narrow specialties, consisted of individual biologists not groups and finally the number of communications was small compared with that which would go through the PIE. He further argued that PIE would not cut preprint production or distribution costs and that it would contribute to disorders in physics communication because of referencing difficulties. At the same time, the quality of material communicated suffered because of the lack of referenced material circulated. He offered three suggestions for improving physics-research communication:

(1) Experiment with a strict limitation on preprint distribution. After a time journals would refuse to publish (on basis of prior publication) papers for which 75-100 preprints were circulated.

(2) Setting up of a document registry where each document or preprint was assigned a number and announced in a weekly list of receipts. The author would supply the copy.

(3) Experiment with groups modelled on the IEG. Although this was a debate between physicists, it was remarkable in that it so accurately forecast what would transpire for the biochemists involved in the IEG experiment.

In the July 23, 1966 issue of Nature (10) an article appeared which praised the PIE debate but was quite opposed to the PIE. stating that the organizers were planning "a scientific journal the outstanding quality of which will be the subordination of discrimination to speed."

Two weeks later, a letter appeared in Nature (11). It was written by a Professor at the University of Edinburgh who was a member of IEG #5. He spoke out against the arguments against the proposed PIE and indicated the enormous value he had gained by being an IEG member. He argued that publication was too slow, the practice of selection by referee was open to considerable objection and lastly, that in order to keep abreast of progress even in one limited field it might often be necessary to see several dozen journals regularly.

Meanwhile, in April 1966 at the annual meeting of the American Association of Immunologists, the merits of IEG #5 were discussed. The result of this discussion which included a list of the disadvantages of IEG and a resolution against further IEG #5 publication were published in Science (12). The disadvantages cited include:

(1) The limited circulation of IEG memos and the implied selection were considered improper im an operation conducted by a governmental agency.

(2) IEG accelerates communication but doesn't add to it since preprints are read by the same scientists who later read published articles.

(3) Memos because they are complete manuscripts do substitute for formal publications and are quoted in formal bibliographies.

(4) Because memos are publications, there is a real danger that they will reduce the usefulness of journals in the field of Immunology.

(5) No referencing process is provided for what is in essence a form of publication.

(6) IEG places undue emphasis on priority and many people are prepublishing all their papers in the form for this purpose.

(7) When manuscripts already accepted for publication are preprinted by IEG, there is an infringement of copyright.

(8) An object of IEG was free discussion and this has not been achieved.

(9) IEG costs too much money and this money should be spent on research.

Next, an editorial, "Preprints galore" appeared in the August 27, 1966 issue of Nature (13). It was a stand against 'formal' preprint circulation systems. Although the proposed PIE was mentioned, IEG was attacked because it was already in existence. The editorial noted the overabundance of memos being circulated; complained of the costs of the system which were felt to be too high for the benefits received and suggested that the money could be best spent elsewhere. The editorial further argued that the memos, because of their wide distribution, were publications. After listing the IEG defects: inaccessibility, impermanence; poor literacy, uneven quality and lack of considered judgment, the editorial suggested that NIH contribute its money and energy to correcting some problems of the current system.

In the same issue of Nature (14) an article "Four Years of Information Exchange" also appears. It reviews the experiment by examining "A Report to the Members" which was circulated by Dr. Albritton. It is unnecessarily biting and sarcastic and in view of the fact that an editorial on the same subject appears in this issue, it amounts to an 'over-kill'. If there could have been any doubt up to then about Nature's stand on the IEG's as well as PIE, there could not possibly be any now.

On September 10 and 11, 1966, the Commission of Biochemical Editors of the International Union of Biochemistry met in Vienna. The editors of five principal journals including: (1) Journal of Biological Chemistry, (2) Journal of Molecular Biology, (3) Biochemistry, (4) Biochemics Biophysica Acta, (5) Biochemistry Journal agreed to propose to their editorial boards that in the future they would not accept articles or communications previously circulated through the IEG's. Also, papers accepted for publication would not be allowed to circulate in the IEG system. The lethal character of these proposals is obvious.

It is my understanding that these proposals were sent in a letter to Dr. Shannon at NIH and were not at this time, at any rate, to be publically announced. However, Nature was aware of the action; Nature published (15) and Nature must have been highly gratified.

In response to the criticism leveled against IEG #5 (12), several letters for and against the IEG's appeared in the October 21, 1966 issue of Science (16). Letters also appeared in Nature (17, 18). It clearly became a case of--there is much to be said for both sides.

The issue grew, an editorial by Philip H. Abelson appeared in Science(19). It pointed out the current criticism of the IEG's, the tight budget restrictions and stressed that the printing lag time was beginning to approach that of Science. He argued that "in an era of information explosion, who needs government-subsidized shoddy merchandize?"

The following week, a letter appeared in Science (20) announcing the fact that the IEG's would be discontinued as of March 1, 1967. Also that there would be no new members after November 15, 1966 and no communication accepted after February 1, 1967. The reasons given were: (1) the original purpose of the experiment had been achieved, the IEG concept was workable, (2) the rapid growth of the IEG's had reached the threshhold limit for the NIH facility.

In something called "Secret Colleges End" (21) Nature commented on the decision to end the experiment saying that it was indeed wise.

The Commission of Editors finally issued their statement on the IEG's and it appeared in Nature, February 11, 1967 (22) and Science, March 10, 1967 (23). Although it could be taken as a superfluous announcement, its implications are significant since it clearly passes judgment on all IEG-type communications.

Dr. Green, Chairman of IEG #1, spoke out against the action of the Commission of Editors (6). He stated that the policy decision made was made by editors and that the special publication committee (in Green's case, the American Society of Biological Chemists) was not consulted before Dr. Shannon was told by the editors of their decision. He further felt that the reasons given were not real but attempts to hide the fact that the editors were apprehensive that the status and prestige of their journals would be downgraded if some mechanism, like the IEG, were distributing to its members, from 6 to 12 months earlier than the journals, the very papers which would eventually appear in the journals.

Like the controversy itself, conclusions must be limited to matters of opinion rather than fact. The emotion-laden language of the published statements suggests that passions were aroused. It is not improbable that the IEG concept was challenged and destroyed for emotional rather than logical reasons--a curious if not unique episode in the drama of science and its work.

One conclusion stems from the mechanics of the experiment rather than the fate which overtook it. Further refinement was necessary to cope with the three problems that developed during the experiment: excessive volume, expanded subject coverage and over-large membership. All are varied symptoms of one difficulty--the conflict in all information services between the desire for precision in service and the diversity of user interests. Some balance between the two should be discoverable and lead to the development of an optimum configuration. The IEG concept could have provided the environment for several experiments of this nature had the effort been allowed to continue

A second conclusion may de drawn from the events which led the experiment to cease. The scientific publication cycle based on professional journals--a routine that operated with a measure of success in the era before World War II may have hastened a more serious crisis by its resistance to innovation and change.

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Analyses of the Experiment*

The NIH was seeking to test a new way of accelerating scientific progress. The method chosen, whatever its initial concept, was that of a preprint exchange. When NIH reached the point of seeking to measure progress, the IEG had come to be considered primarily in this light. To a degree, this method is assumed to increase the availability of up-to-date, highly specific research information and therefore scientific progress, i.e. progress of biomedical research.

Since quantification of the specific influence of the IEG on scientific progress can not be precisely determined, the value and utility are assessed by examining both the opinions contributed by the scientist-members and data dealing with the extent to which the service was actually utilized.

NIH thus moves from a priori assumption to a data collection of opinion on utility as evidence to sustain the assumption about scientific progress. Two sources of bias were noted before the evidence bearing on the possible value of the IEG operation was reviewed:

1) The service was provided free of charge and "one tends to undervalue things that are given free."

2) Membership carried with it some degree of prestige which "would tend to make others more disposed to join, and after a time either to freely voice their disappointment or to overrate their experience in such a prestigious association."

If these are "general truths," it would appear that any attempt at gathering evidence would be severely hindered. All negative response could then be construed as an under valuing of the service. On the other hand, praise of the service and its prestigious association, as overrating.

NIH then states that the balance of the evidence indicates that there was a high level of acceptance of the IEG as a new mode for rapid communication, complementary to the long established mode of journal publication.

The evidence is tenuous. The fact that no scientist is known to have declined membership may tell us more about scientist's acceptance of free services that about the specific IEG operation. Addition to the membership roles was no difficult task and in 50% of the memberships is was the only "information exchange" in which they really

*The data and statements cited in this section were provided by personal communication. Notes refer to Information Exchange Group Final Report (1961-1967) November 1968. Administrative Report.

Tabulations - Question I

This question asked if it could be documented in that IEG had brought advance information that had influenced one or more research decisions. Members were asked to cite as many as four (4) specific memos by number and then select from a list of seven (7) descriptions of effects, those that applied in each example that was cited. Following the list of descriptions, two (2) spaces were provided for use in estimating the time and money which were saved or lost as a result of the incident mentioned. Only 483 of the 1,077 respondents answered question I and only 457 provided the specific documentation sought in this question.[1]

Analyses made by NIH indicate the following breakdown for the 483 documented answers:

> 456 of the 483 respondents cited 1,021 instances in which an identified memo (or a group, collectively) had favorably influenced a research decision;
>
> 235 of the above 456 cited 342 occasions (in the above 1,021 instances) in which an identified memo had "prevented unnecessary duplication";
>
> 329 of the above 456 cited 534 instances in which an identified memo had suggested earlier new leads;
>
> 312 of the above 456 checked time saved and/or money saved in 505 of the 1,021 instances, and 251 of the 312 ventured an estimate of months and/or dollars saved in 422 instances.
>
> 8 of the above 488 respondents cited 9 instances in which an identified memo had influenced a research decision unfavorably. Seven (7) of the 8 are also represented in the 456. Two (2) of the 8 estimated months and/or dollars lost.
>
> 125 of the 483 respondents cited 168 instances in which an identified memo (or a group, collectively) influenced a research decision, but failed to give evidence to indicate whether favorable or unfavorable. In a few instances the cited memo was stated to have had no influence on a certain research decision. Ninety-nine of these respondents are also represented in the foregoing 456."[2]

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[1] Draft #6 p. 12.

[2] Draft #6, p. 12 and 13.

Aside from the low response rate to this question, several other factors may have a bearing on any analysis of the responses.

The question was poorly formated. It was repetitious and made no allowance for a possible negative response. Considering the volume of memos circulated by some IEG's, asking recall of a specific memo is an almost unreasonable request. Also, any estimates involving time and money parameters while interesting are necessarily imprecise.

> "It is obvious that the responses to Question I represent a substantial underestimate of the effect of memos on research decisions and of the value of the IEG service to the participating scientists but no attempt will be made here to draw conclusions of a quantitative kind from this question. If in the short life-span of an IEG program only a fraction of the scientist-members have had the experience of being influenced in a research decision, the question arises whether a longer time would have given a larger number of scientists the opportunity for such an experience. The expectation would appear to be rational."[1]

While these responses may represent a "substantial underestimate" of the effect of memos, it is not "obvious" that this is so. Also, while length of operation of the program may "rationally" lead one to expect more incidences of influence by a greater number of scientists there is no evidence that this will necessarily occur. This information must be considered on a comparative basis if it is to yield any significant conclusions.

All Respondents - Question II

Question II asked the respondents to select from 6 possible time sequences, that time period which represented the average time in which information in memo form reached them before its final appearance in a journal.

The tabulated data are presented in Appendix II, Tables III and III-A. The respondents estimates were:

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[1]Draft #6, p. 13.

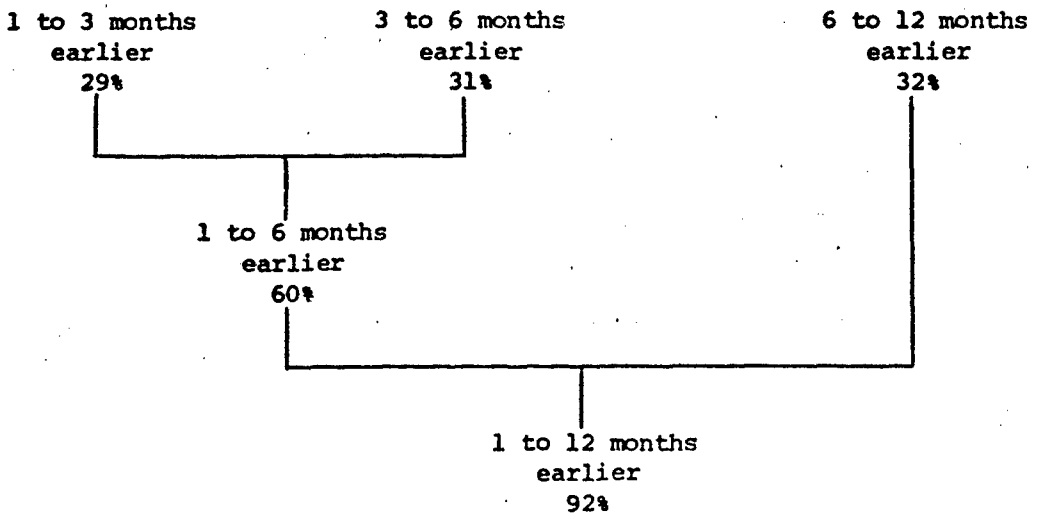
"More than 12 months earlier	5%
6 to 12 months earlier	32%
3 to 6 months earlier	31%
1 to 3 months earlier	29%
No earlier	1%
1 to 3 months later	2%"[1]

NIH concludes that "...on the average, information appeared about 5 to 6 months earlier in memos than in journals..."[2]

Apparently members did feel that they received information earlier via memos than via journals since responses do cluster equally about the three earlier categories. An examination of these three earlier categories (1) 1-3 months, (2) 3-6 months, (3) 6-12 months indicates that they are unequal. If they are equalized (Figure 1) into 2 categories 1-6 months and 6-12 months, the former becomes 60% and the latter 32% and thus the average cannot really be placed at 5-6 months earlier as had been indicated.

Figure 1

Question II Responses - % in 3 earlier categories



[1]Draft #6, p. 13.

[2]Draft #6, p. 13.

(1) Read completely _____%
(2) Read in large part _____%
(3) Read only abstracts summary _____%
(4) Read only the Title _____%
(5) Do not even look at _____%

The responses, tabulated in Appendix II, Table IV, indicate the following averages for all seven groups combined were:

Read completely	20%
Read in large part	20%
Read only the abstract or summary	32%
Read only the title	28%
Did not even look at	1% *

For all groups, members estimated they read about 39% of the memos completely, or in a large part, in 32% only the abstract and summary were read and in the rest only the title was scanned. It is reasonable to assume that the greater the similarity of interests by the members of a group, the more likely it is that they will read each other's papers. The scientists in IEG #7 were receiving about 15 memos/week and it is hardly surprising that in 67% of the memos only the abstracts, summaries or titles were read. On the other hand, "overload" could not have been responsible for the fact that members of IEG #3 read memos no more extensively than those in IEG #7 because they were receiving less than one memo a week. IEG #2 (Hemostasis) and #6 (Interferon) ranked substantially higher than all other groups in the frequency with which members read each other's reports; other factors being equal, this suggests a high degree of similarity of research interests."[1]

Tables V and V-A (Appendix II) show the distribution of the extent of reading of IEG memos. It should be noted that in Table V, the total number of respondents for each category except category 5 exceeds the total number of respondents who answered Question III-A.

Table VI presents the modal response to Question III-A.

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[1]Draft #6, p. 14.

*Discrepancy due to rounding.

TABLE B

Question II Response Pattern by Category

# of Respondents Selecting 6 to 12 months earlier	# of Respondents Selecting 3 to 6 months earlier	# of Respondents Selecting 1 to 3 months earlier

This pattern is the reverse for Group #7.

Also, if the responses to Question II which were received from Group #7 members are not included in the calculation of the Total Responses to Question II, the pattern shown in Table C emerges.

TABLE C

Question II - Total Response in 3 Earlier Categories

	Groups #1 - #6	Group #7
6 - 12 months earlier	195	82
3 - 6 months earlier	158	141
1 - 3 months earlier	82	152

Thus the pattern mentioned previously for the six (6) individual groups still holds when the responses for all groups are combined. If the categories are equalized, see Figure 2, the 1-6 months earlier category now has only a slight lead over the 6-12 months category, 240 vs 195 for these 6 groups.

Figure 2

Question II Total Response

	1 to 3 months earlier	3 to 6 months earlier	6 to 12 months earlier
IEG #1-6	82	158	195
IEG #7	152	141	82

	1 to 6 months earlier
IEG #1-6	240
IEG #7	293

Examination of #7 results indicates that the 1-6 months earlier category is by far the favored response given by members of this group, 293 vs 82.

This (perhaps) over-tabulation of the responses to Question II has nonetheless provided information which might be useful in making some inferences about the operation of an exchange group. The odd responses from IEG #7 members have demonstrated the variability with which group members receive earlier information.

It appears that the benefits of IEG membership to IEG #7 members did not necessarily include the receipt of information much earlier than it appeared in its final published form.

Questior III

Question III-A

Question III-A asked the members to estimate the percentage of memos which were read in whole or in part. The five items for describing extent read were:

TABLE VI

Modal Response - Question III-A

CATEGORY	Modal Response	
	NIH (N=484)	WFH (N=736)
1. Read completely	10% or less	10% or less
2. Read in large part	10% or less	10% or less
3. Read only abstract or summary	20% or less	20% or less
4. Read only the title	20% or less	10% or less
5. Do not even look at	10% or less	10% or less

This may serve to indicate that less use was made of the memos than had been indicated by the previcus analysis which was based on average response per category. It is also interesting to note that the modal response for category 1. Read Completely, does represent approximately 64% of the total 484 NIH respondents.

Tables VII and VII-A (Appendix II) present the distribution of responses to Question III-A by the seven IEG's. The modal responses of each of the groups as indicated in Table VIII show that only members of IEG #6 seemed to completely read more memos than any of the other groups. These were the only responses which were not in the 10% or less class for this category.

Question III-B

Question III-B asked members about their handling of memos which they did not want to read. Respondents could select any or all statements from the following:

(1) Screening them is a burdonsome chore
(2) Screening them is no problem.
(3) All memos should be referred to remove the papers of poorer quality.

(4) An abstract on the front cover would be helpful.
(5) The IEG's research area is too broad. There would be fewer memos if the area were smaller.

As the statements indicate, the question is two questions and really considers the handling problem in conjunction with possible solutions to such a problem. Analysis of the results are then quite complex.

In the analysis by NIH (Table IX, Appendix II) only Total Response for each of the five statements was tabulated. No tabulations involving various combinations of choices which were allowed by the question are presented. This treatment of the data will be compared with tabulations in which the responses have been sorted into categories based on the various combinations of possible choices.

NIH tabulations show that 90.3% (See Table IX) of the respondents felt that screening of unwanted memos was no problem (Choice #2), while all other respondents selected (#2) in combination with one of the other statements. Selecting (#2) in combination with one (1) or more of the other choices effectively means a different response to the question.

Table X shows a complete analysis of Question III-B. Responses from each IEG are presented along with a summary of the responses for all groups. Inspection of the table shows that two (2) categories received very large responses. These were (#2), Screening no problem and (#2 and #4) combination, Screening no burden and Abstract helpful. The group responses for these categories are shown in Table XI.

TABLE XI

Question III-B. Respondents choosing (#2) and (#2 and #4)

IEG	#2	(#2 & #4)
1	69	49
2	26	6
3	24	10
4	40	21
5	47	57
6	29	27
7	105	140
Total	340	310

Only the responses from IEG group #2 indicate that to these members, screening was no problem. Responses for IEG's #5 and #7 indicate that although it wasn't a "problem", abstracts on the cover would be helpful, an apparent indication of a degree of dissatisfaction.

The responses for all groups show about equal response for these two categories thus some degree of dissatisfaction did exist.

The information gained from the analysis of Question III-B is probably of marginal utility. While the intent of the question is obvious and the information sought by it would have been useful, the question suffers from lack of subtleness which is compounded by the fact that it was many questions.

Question IV

Question IV is again a triumph of intent over content. This question attempted to gain knowledge about the IEG members use of journals. The statements from which selections could be made are listed below:

1. I no longer read journals and have cancelled subscriptions to some journals.

2. I read journals but completely omit papers based on IEG memos.

3. I look for articles previously circulated as IEG memos.

4. I still read journals as before.

5. I do not feel the necessity of journal publications if my papers have gone through IEG.

6. I want my research papers published in a good journal, regardless of IEG.

It is evident that the question was in inquiry about two different aspects of journals, journals as information inputs and also as information disseminators. While the two are not wholly discrete entities, the matter of journal publication is quite complex. It is an almost inappropriate question to be asked in a survey of IEG members. That is, unless the data were to be used in a presentation to journal editors and publishers so that their fears of journal-elimination by the IEG program, could be disspelled.

participated. Passive assimilation must surely be more clearly differentiated from a high level of acceptance.

Opinion Polls and Questionnaires

Three assessments of the importance and value of the memo service were made by NIH. The two preliminary surveys and their shortcomings have been previously discussed. NIH agrees that the results do not provide definitive proof that the IEG system accelerated scientific progress in the research areas concerned. The third survey ("The Final Questionnaire") was mailed to all members of all groups near the end of the experiment, almost simultaneously with announcement that the IEG Program was being terminated.

The Final Questionnaire

A copy of the Final Questionnaire is attached (Appendix I). It is worthwhile to briefly discuss the questionnaire itself before commencing with any presentation of the responses which it elicited.

NIH offers only two critical comments about this last survey. The first involves timing, that is, the rather unfortunate fact that both the letter announcing the termination of the IEG program and the questionnaire itself were dispatched almost simultaneously. The external pressure being brought to bear on the program must be responsible in part, for this coincidence which may have caused a decrease in the number of returned questionnaires.

The second criticism was aimed directly at the questionnaire, and more specifically at Question 1. This question sought evidence that advance information supplied by IEG memos favorably affected research decisions. The scientists were asked to cite one or more examples in which such decisions were influenced and to indicate in what manner they were affected. The scientist was also asked to document these instances by giving the specific numbers of the memos responsible. It may be true that after encountering this question, scientists lost interest in answering this or any part of the questionnaire.

The remaining questions of the Final Questionnaire seem to emphasize the experiment itself and provide very little insight into what the experiment was designed to study.

Question II and Question IV compare information exchange via IEG memo with that of journal publication. The former seeking information

about the speed of the IEG memo circulation over that of journals while the latter queried about the IEG influence on the use of journals both as information sources and as outlets for the publication of research results.

Time should not really be a topic that is open to question since preprints, by definition, precede journal publication. While a measure of journal lag-time as estimated by journal users by be truly helpful, this approach does fail to take into consideration any impact of the IEG's on other means of communication, i.e. informal, which were surely operating within the prestigious association of the IEG.

Data on journals, both as information sources and publication devices could have been used as evidence to assuage the fears of both journal editors and publishers. Question IV sought information about two activities, not one, and two questions might have provided more useable data.

Question III was a two part question. Part A asked for percentage estimates of memo-reading/handling behavior and Part B dealt with opinions about the volume of memos circulated and solutions to the volume problem if a volume problem existed. It would be very difficult to relate Parts A & B in any analysis and even more difficult to interpret Part B because of the manner in which it was structured.

Questions V and VI were both comment questions. They sought opinion about circulating abstracts only and the respondents summary of views on the IEG.

For whatever the reasons, only 1,077 (29.4%) of the total membership of 3,663 returned usable questionnaires with answers to one or more of the six major questions. The response pattern for each of the questions is indicated in Appendix II, Table 1.

The IEG Program served seven groups and each of these groups varied in size. As Table 1 indicates, although the percent of members within a group who responded was similar for each group, the responses from one group, IEG #7, do represent nearly 45% of the total response.

Analysis of the response pattern for each of the questions is indicated in Tables II and II-A. These two tables are presented because of the variability in tabulations which showed up as the questionnaire were reexamined. It is interesting to note that in only two cases, Question II and V, did as many as 80% of the respondents reply. This 80% represents less than 25% of the total membership. It should also be remembered that about 45% of the respondents to Questions II and V were from only one IEG, that is IEG #7.

While it is impossible to ascribe much to this finding, it may be an indication that the IEG's were not really functioning significantly ahead of journals, were not efficiently providing information by overcoming the proverbial journal-lag time to the degree that may have previously been envisioned.

Returning to Figure 1, it would appear that the safest conclusion which may be drawn from the data is the following:

> 92% of the respondents estimated that they received information via IEG, from 1 to 12 months before its final appearance in a journal.

This is not a startling conclusion since the IEG operated as a preprint exchange, meaning of course, that information was intended to be circulated before publication.

Response by Group

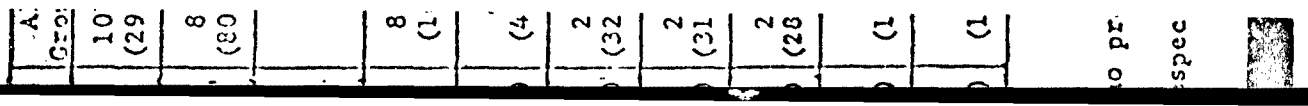
If the responses to Question II are examined on an individual group basis, the modal response based on data in Table III-A was 6-12 months earlier for all groups - except group #7 which had a modal response in the 1-3 months earlier category. See Table A.

TABLE A

Question II Modal Response

IEG #1	#2	#3	#4	#5	#6	#7
6 to 12 months earlier						1 to 3 months earlier

Re-checking Table III-A it can be seen that for all the groups except #7, the number of respondents per earlier category decreased in the order indicated in Table B.



The other question within Question IV is plainly poorly designed, making the results even more difficult to comprehend and interpret.

NIH again chose not to consider combination choices within the question as separate categories, preferring to tabulate on the basis of total response to each of the 6 choices. "The response (Table XII, Appendix II) indicated that they continued to read journals as before and a large proportion wanted their own papers published in good journals regardless of the existence of the IEG Program".[1]

Table XIII (Appendix II) shows a complete tabulation of the responses to Question IV.

As Table XXI (Appendix II) indicates, 91.3% still read journals as before. However, only 2 categories of responses, (#4) and (#4 & #6) combination would indicate this as a response since choice combinations do alter the meaning of the response somewhat. When this is considered as in Table XIII, the data indicates that only 58.1% of the respondents still read journals as before. This interpretation may not be overly convincing, but it does show the results to be less overwhelming and one-sided than had been indicated by the previous analysis.

Question V

Question V asked the respondents to give their advice on the possibility of circulating abstracts only instead of full papers. The responses indicate that 10% of the respondents considered abstracts acceptable or preferrable.

Question VI

Question VI was another comment question which asked respondents to comment on the IEG if their answers to the 5 previous questions had not amounted to a full expression of their views.

Unfortunately, any response to this question was optional on the part of the respondents. Although the responses to this type of question are difficult to interpret. The data from all respondents

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[1] Draft #6, p. 15.

would have been useful. It is too difficult to say whether more views would have been expressed if the question had been fully integrated into the survey. The number of respondents was smaller than for some of the other questions.

While no tabulations for this question are available from NIH, they conclude:

> "1,077 scientists indicated that they were sufficiently impressed with the service which had been of definite value to them and was particularly suited to their specialized needs. The feature of the Program which seemed especially attractive to the majority was that it provided immediate access to current information learning on their own specific research problems; the advantages cited included reduction of time and effort in literature searches."[1]

Table XV presents a tabulation of the response pattern to Question VI by IEG:

TABLE XV

Question VI

IEG #	# of Questionnaires Returned	Answering Question VI
1	178	107
2	41	29
3	57	28
4	84	50
5	180	121
6	77	47
7	457	284
TOTAL	1,074	666

[1] Draft #6, p. 15.

Of all the comments about the IEG which were made in Question VI, 1,042 were categorized according to the schedule which is attached. (Table XVI, Appendix II). Of this total number of categorizable comments 616 were favorable while 426 were unfavorable. An analysis of this type naturally assumes an equality (of favor) in all comments. For example, any scientists may have talked of the usefulness of IEG while bemoaning its use as a priority establishing device. Thus, one 1 favorable and 1 unfavorable. However bizzare this approach might appear, it does provide some quantitative data which can be used as a basis for establishing insights about the IEG program from the group members point-of-view. In truth, it would appear that both the favorable and unfavorable aspects of this program can be readily inferred from just such an analysis.

Ths schedule of categories used in classifying the scientists comments was developed from their own responses. Difficulty in eliminating overlap and/or maintaining mutually exclusive categories was encountered. The evolution of the final schedule did not however, lead to a solution of this difficulty as many of the comments were sufficiently ambiguous in meaning that further pigeon holing within the schedule would have required inferences to be made which were clearly beyond the impartial and objective judgment of any recorder. This is, of course, one of the major criticisms of the questionnaire survey methodology.

An examination of the schedule shows that category A1 is closely related to all the other major A categories. The exact relationship of A1 to these other categories and in the case of A4 its sub-categories, can never be precisely determined. Less difficulty in settling on a final scheme for category B was encountered as the total product evolved from the analysis. The negative aspects of the program seemed more easily stateable by the respondents and allowed rather more defined category limits which provided the necessary structure for classifying these responses into specific complaints.

If the responses as categorized in the summary table (Table XVII, Appendix II) are examined on a comment for comment basis then the most frequently mentioned comment focused on the general usefulness of the IEG program. The next 2 most frequently voiced comments were about equally selected, and involved both positive and negative opinions. While the service was praised for its speed and usefulness as a current awareness tool, it was also criticized for the lack of informal type communications which were circulated.

Examination of the responses by category shows that the respondents found the IEG useful, specifically by functioning as a current awareness tool by quickly providing them with information.

The individual IEG response pattern as indicated in Table XVII shows that for only two IEG's, #3 and #5 were the number of negative views greater than the positive. Probably very little importance should be attached to any excessive interpretation of the group response data. In fact, the responses from IEG #3 were from only 28 respondents while IEG #5 actively had been in some degree of turmoil since the April 1966 Annual Meeting of the American Association of Immunologists.

Summary of Final Questionnaire Results

At this point it is necessary if not desirable to briefly summarize the results of this final survey.

Any evidence that the IEG accelerated scientific discovering is at most fragmentary. What has emerged is a picture of a preprint exchange service. It was a service which circulated material some one to twelve months before its appearance in a journal.

Of the material circulated 10% or less was read by 64% of the respondents who generally felt that while screening of this material was no problem, inclusion of an abstract would be helpful. However, elimination of the circulation of full papers in favor of the distribution of abstracts was acceptable to only 18% of the respondents.

It is noteworthy too, that despite all this advance information, the respondents still used journals althouth the IEG did provide them with information quickly and did keep them aware of current developments in their research areaa.

APPENDIX I

SAMPLE ---The Final Questionnaire

Some Questions on Which Your Advice is Needed

(Any data released will be statistical in nature and your identity will not be revealed)

IEG #1

I. The purpose of IEG, as stated, has been "To accelerate scientific discovery by speeding research information from the originating laboratory to other laboratories where the information might be needed." Can it be documented that IEG has brought you advance information that has influenced one or more research decisions in your _____ years of membership? (Please fill in No. of years)

Your signature (confidential): _____

Example #1: IEG Memo #_____ brought news that: ——→

WOULD YOU PLEASE GIVE DETAILS OF THE INCIDENT?

(a) influenced research decisions?
(b) prevented unnecessary duplication?
(c) had no effect
(d) suggested new leads earlier?
(e) was misleading or gave a false lead?
(f) gave information that might have been missed in searching the journals?
(g) gave information that was deleted in the journal's editorial review?
(h) Est. money $_____ {saved? / lost?
(i) Est. time months_____ {saved? / lost?

Example #2: IEG Memo #_____ brought news that: ——→

WOULD YOU PLEASE GIVE DETAILS OF THE INCIDENT?

(a) influenced research decisions?
(b) prevented unnecessary duplication?
(c) had no effect?
(d) suggested new leads earlier?
(e) was misleading or gave a false lead?
(f) gave information that might have been missed in searching the journals?
(g) gave information that was deleted in the journal's editorial review?
(h) Est. money $_____ {saved? / lost?
(i) Est. time months_____ {saved? / lost?

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Example #3: IEG Memo #_____ brought news that: → (a) influenced research decisions?

WOULD YOU PLEASE GIVE DETAILS OF THE INCIDENT?

(b) prevented unnecessary duplication?

(c) had no effect?

(d) suggested new leads earlier?

(e) was misleading or gave a false lead?

(f) gave information that might have been missed in searching the journals?

(g) gave information that was deleted in the journal's editorial review?

(h) Est. money {saved? / lost?
$_____

(i) Est. time {saved? / lost?
months_____

Example #4: IEG Memo #_____ brought news that: → (a) influenced research decisions?

WOULD YOU PLEASE GIVE DETAILS OF THE INCIDENT?

(b) prevented unnecessary duplication?

(c) had no effect?

(d) suggested new leads earlier?

(e) was misleading or gave a false lead?

(f) gave information that might have been missed in searching the journals?

(g) gave information that was deleted in the journal's editorial review?

(h) Est. money {saved? / lost?
$_____

(i) Est. time {saved? / lost?
months_____

II. Can you evaluate how much earlier, on the average, information has reached you via IEG, than it has via its final appearance in the journal? Please indicate by ✓ and/or comment.

1. No earlier?
2. More than 12 months earlier?
3. 1 to [illegible] months earlier?
4. 1 to 3 months <u>later</u>?
5. 6 to 12 months earlier?
6. 3 to 6 months earlier?

<u>Comment?</u>

III. One hears the remark, occasionally, that no member has the time to read <u>all</u> the memos that come over his desk.

A. Can you estimate here what percentage of memos you

1. Read completely ______ %
2. Read in large part ______ %
3. Read only the abstract or summary ______ %.
4. Read only the title ______ %
5. Do not even look at ______ %

<u>Comment?</u>

B. Regarding the memos you do not want to read, please indicate your views by ✓ and/or comment.

1. Screening them out is a burdensome chore.
2. Screening them out is no problem.
3. All memos should be refereed to remove the papers of poorer quality.
4. An abstract on the front cover would be helpful.
5. The IEG's research area is too broad. There would be fewer memos if the area were smaller.

<u>Comment?</u>

IV. In your experience, how does the IEG influence your use of journals and your attitude toward journal publication of your research? Please indicate by ✓ and/or comment.

1. I no longer read journals and have cancelled subscriptions to some journals.
2. I read journals but completely omit papers based on IEG memos.
3. I look for articles previously circulated as IEG memos.
4. I still read journals as before.
5. I do not feel the necessity of journal publication if my papers have gone through IEG.
6. I want my research papers published in a good journal, regardless of IEG.
7. Other:

<u>Comment?</u>

V. What would be your advice on circulating abstracts only? Comment?

VI. If your answers to here do not amount to a full expression of your views on IEG (both pro and con) would you please summarize your views here (and continue on the back of the page if necessary)?

APPENDIX II

211
pups
075
9.4)
755
0.2)

755
100)
1

669
1.3)
10
1.3)
723
5.8)
166
2.0)
173
2.9)

TABLE 1

Final Questionnaire

Group Response Pattern

IEG #	Total Group Membership	% of Total Membership	# of returned Questionnaires*	% of Total Response	% of Members within Group responding
1	735	20.04	178	16.56	24.22
2	127	3.19	41	3.81	32.39
3	171	4.66	57	5.31	33.33
4	297	8.11	84	7.82	28.28
5	611	16.65	180	16.76	28.47
6	250	6.82	77	7.17	30.80
7	1472	40.18	457	42.55	31.04
Total	3663	99.75	1074	100.00	29.29

*Non-NIH Tabulation. A retabulation of questionnaires

Final Questionnaire

Response Pattern By Question

Question No.	#of Respondents (all groups)	%of 1,077	% of Total Membership Responding	Group #1 Response	#2	#3	#4	#5	#
I	483	44.8	13.19	---	---	---	---	---	---
II	869	80.8	23.72	143	33	31	52	143	68
III A	484	45.0	13.21	81	19	22	39	86	35
III B	702	65.3	19.16	135	31	32	52	72	54
IV	755	70.2	20.61	12[illegible]	32	31	38	129	50
V	890	82.8	24.29	142	34	45	55	149	65
VI	---	--	---	---	---	---	---	---	---

TABLE II-A (WFH Tabulations)

Final Questionnaire

Response Pattern By Question

Question No.	#of Respondents (all groups)	%of 1,074	% of Total Membership Responding	Group #1 Response	#2	#3	#4	#5	#6	#7
I	---			---	---	---	---	---	---	-
II	860			137	33	33	62	138	72	3
III-A	736			121	34	38	57	117	61	3
III-B	989			164	37	49	72	164	67	4
IV	1025			170	40	51	76	167	76	4
V	---			---	---	---	---	---	---	-
VI	666			107	29	28	50	121	47	2

TABLE III (NIH)

Final Questionnaire (F.Q.) Responses: The Advance Information -- How Much Earlier it Arrived (Question II)

Persons	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	G
All Respondents to Final Questionnaire (F.Q.)* percent of membership	185 (24.9)	41 (32.3)	52 (30.4)	83 (27.9)	180 (29.5)	75 (30.0)	461 (31.3)	1 (2
Answering Question II, percent of all Respondents	143 (77.3)	33 (80.5)	31 (59.6)	52 (62.6)	143 (79.4)	68 (90.7)	399 (86.6)	(8
Responses**								
Check-list items / Persons Answering	143 (100)	33 (100)	31 (100)	52 (100)	143 (100)	68 (100)	399 (100)	(
"More than 12 months earlier", no. %	9 (6.3)	2 (6.1)	7 (22.6)	4 (7.7)	5 (3.5)	6 (8.8)	10 (2.5)	(
"6 to 12 months earlier"	56 (39.2)	12 (36.4)	13 (41.9)	22 (42.3)	57 (39.9)	35 (51.5)	83 (20.8)	(3
"3 to 6 months earlier"	41 (28.7)	12 (36.4)	8 (25.8)	9 (17.3)	49 (34.3)	21 (30.9)	130 (32.6)	(3
"1 to 3 months earlier"	31 (21.7)	4 (12.1)	3 (9.7)	15 (28.8)	28 (19.6)	5 (7.4)	165 (41.4)	(2
"No earlier"	4 (2.8)	-	-	1 (1.9)	2 (1.4)	-	5 (1.2)	(
"1 to 3 months later"	2 (1.4)	3 (19.0)	- (1.9)	1 (1.9)	2 (1.4)	1 (1.5)	6 (1.5)	(

* "All Respondents" in this and subsequent Tables refers to all members (in each and in all groups) who p vided answers to one or more questions contained in the "Final Questionnaire" shown in Table X.

** Number in parentheses is the percentage representing the number of persons immediately above with respe to total number of respondents in each group (and all groups) answering the question.

TABLE III - A (WFH)

FINAL QUESTIONNAIRE RESPONSES:

THE ADVANCE INFORMATION -- HOW MUCH EARLIER IT ARRIVED (QUESTION II)

PERSONS	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6	GROUP 7	ALL GROUPS
All Respondents to Final Questionnaire % of Membership	178	41	57	84	180	77	457	1077
Answering Question II % of All Respondents (Within Group)	137	33	33	62	138	72	385	860
RESPONSES								
Person Answering / Check-list Items	137 (100)	33 (100)	33 (100)	62 (100)	138 (100)	72 (100)	385 (100)	860 (100)
More than 12 months earlier, No. %( )	7 (5.11)	3 (9.09)	6 (18.18)	4 (6.45)	4 (2.90)	7 (9.72)	5 (1.3)	36 (4.19)
6 to 12 months earlier	52 (37.96)	15 (45.46)	14 (42.42)	24 (38.71)	53 (38.41)	37 (51.39)	82 (21.30)	277 (32.21)
3 to 6 months earlier	51 (37.23)	9 (27.27)	9 (27.27)	17 (27.41)	50 (36.23)	22 (30.56)	141 (36.62)	299 (34.77)
1 to 3 months earlier	25 (18.25)	4 (12.12)	4 (12.12)	15 (24.19)	28 (20.29)	6 (8.33)	152 (39.48)	234 (27.21)
No earlier	1 (.73)	0 (0)	0	2 (3.23)	2 (1.45)	0 (0)	3 (0.78)	8 (0.93)
1 to 3 Months later	1 (.73)	2 (6.06)	0	0	1 (o.73)	0 (0)	2 (o.52)	6 (0.70)

TABLE IV (NIH)

F.Q. Responses: Percent of Memos Read (a) Completely, (b) in Large Part, etc. (Question III-A)

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	All Groups
All Respondents to F.Q., Percent of membership	185 (24.9)	41 (32.3)	52 (30.4)	83 (27.9)	180 (29.5)	75 (30.0)	461 (31.3)	1077 (29.4)
Answering Question III-A, Percent of All Respondents*	81 (43.8)	19 (46.3)	22 (42.3)	39 (47.0)	86 (47.8)	35 (46.7)	202 (43.8)	484 (44.9)
Responses: Percent of Memos								
1. "Read completely or in large part", %	38.5	59.8	32.5	44.3	37.6	65.6	32.8	39.2
Group Rank-order	4	2	7	3	5	1	6	
2. "Read completely"	17.6	31.2	15.8	24.5	19.8	39.1	14.3	19.5
3. "Read in large part"	20.9	28.6	16.7	19.8	17.8	26.5	18.0	19.7
4. "Read only the abstract or summary"	28.7	29.1	38.5	37.5	29.1	27.8	33.6	32.1
5. "Read only the title"	30.6	10.6	27.8	17.7	31.6	6.6	33.3	27.7
6. "Do not even look at"	1.9	0.3	1.2	0.4	1.4	0	0.8	1.0
7. No. Memos Received Wk,** Means	6.9	1.7	0.8	1.9	7.5	2.5	14.9	—
Group Rank-order	3	6	7	5	2	4	1	
8. No. Memos Read*** Means	2.66	1.02	0.26	0.84	2.82	1.64	4.9	—
Group Rank Order	3	5	7	6	2	4	1	

* Many replies to Question III-A had to be discarded because percentages as entered by the respondents did not add up to 100%.

** From Table V; data based on a 10-wk. sample period in Spring, 1966.

*** Determined by dividing means in line 7 by those in line 1.

TABLE V (NIH)

Question III-A

Distribution of Extent of Reading of IEG Memos

PART		Percent 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	T
1		307	119	78	16	52	10	7	12	8	6	615
	Percent	49.9	19.3	12.7	2.6	8.4	1.1	2.0	2.0	1.3	1.0	
2		230	142	99	39	52	7	2	4	2	5	582
	Percent	39.5	24.4	17.0	6.7	8.9	1.2	0.3	0.7	0.3	0.9	
3		111	135	118	69	83	39	21	24	11	1	612
	Percent	18.1	22.1	19.3	11.3	13.6	6.4	3.4	3.9	1.8	0.2	
4		98	108	72	42	65	29	28	32	18	9	501
	Percent	19.6	21.6	14.4	8.4	13.0	5.8	5.6	6.4	3.6	1.8	
5		32	20	6	9	15	5	9	9	2	2	109
	Percent	29.4	18.3	5.5	8.2	13.8	4.6	8.2	8.2	1.8	1.8	

1. Read completely.
2. Read in large part.
3. Read only the abstract or summary.
4. Read only the title.
5. Do not even look at.

* Total no. Respondents 484.

TABLE V-A (WFH)*

Question III-A

Distribution of Extent of Reading of IEG Memos

ALL GROUPS	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	TOTAL
1	332	136	88	20	55	12	7	13	9	11	683
2	206	179	114	43	47	11	3	4	1	4	612
3	100	154	141	73	96	47	25	31	11	3	681
4	115	99	63	52	74	31	39	40	20	9	542
5	18	8	2	0	2	0	0	1	0	1	29

Total number respondents 736

TABLE VII (NIH)

Question III-A

Distribution of Extent of Reading IEG Memos by Group

IEG	Category*	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
#1	1	65	18	11	5	2	0	2	4	0	1
	2	37	26	12	14	6	3	0	1	0	1
	3	19	31	19	6	13	7	4	3	1	0
	4	17	18	10	9	9	6	7	10	2	1
	5	5	3	0	0	1	0	0	1	0	0
#2	1	7	4	4	0	6	2	2	1	0	1
	2	4	7	4	2	4	1	0	0	1	2
	3	5	3	6	4	3	3	1	0	1	0
	4	5	6	3	1	1	0	0	0	0	0
	5	1	0	0	0	0	0	0	0	0	0
#3	1	14	6	2	2	1	1	0	1	0	0
	2	9	7	3	1	2	1	1	0	0	0
	3	3	6	10	1	7	0	2	3	1	0
	4	4	4	2	1	3	2	3	1	2	0
	5	2	0	1	0	0	0	0	0	0	0
#4	1	23	13	6	2	1	2	0	3	5	0
	2	14	12	13	6	2	1	1	1	0	0
	3	8	5	3	9	13	3	3	3	1	0
	4	8	10	9	1	0	1	2	0	0	0
	5	1	1	0	0	0	0	0	0	0	0
#5	1	31	20	10	3	14	0	0	0	1	1
	2	48	20	10	3	14	0	0	0	1	1
	3	24	29	18	7	5	0	0	0	0	0
	4	12	27	19	8	13	5	3	3	0	1
	5	17	13	4	9	13	5	9	7	2	2
#6	1	9	8	9	1	16	5	2	1	2	2
	2	13	9	16	4	7	0	0	2	0	1
	3	11	9	9	3	5	5	1	3	1	0
	4	10	3	5	1	0	0	1	0	0	0
	5	1	0	0	0	0	0	0	0	0	0
#7	1	158	50	36	3	12	0	1	2	0	1
	2	105	61	41	9	17	1	0	0	0	0
	3	41	52	53	39	37	21	10	12	6	1
	4	42	40	24	21	39	15	12	18	14	7
	5	5	3	1	0	1	0	0	1	0	0

*1. Read completely; 2. Read in large part; 3. Read only abstract or summary; 4. Read only the title; 5. Do not even look at.

TABLE VII-A (WFH)

Question III-A

Distribution of Extent of Reading IEG Memos by Group

IEG	Category*	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
#1	1	66	16	18	5	2	0	2	4	0	2
	2	37	28	15	13	8	4	0	1	0	1
	3	19	34	21	7	12	8	5	5	1	0
	4	19	19	12	11	10	5	7	12	1	1
	5	5	2	0	0	1	0	0	0	0	0
#2	1	7	5	4	0	6	4	2	1	0	3
	2	4	8	4	2	4	1	0	0	1	1
	3	5	5	6	4	3	3	1	0	1	0
	4	6	5	3	1	1	0	0	0	0	0
	5	1	0	0	0	0	0	0	0	0	0
#3	1	15	7	4	2	1	1	0	1	0	1
	2	10	9	2	1	3	1	1	0	0	0
	3	3	6	12	1	8	1	2	3	1	0
	4	4	6	2	2	3	2	4	0	2	0
	5	2	0	1	0	0	0	0	0	0	0
#4	1	23	14	6	2	2	2	0	2	5	0
	2	13	11	14	7	2	2	1	1	0	1
	3	8	6	3	10	13	3	3	2	1	0
	4	9	11	9	1	0	1	2	0	0	0
	5	1	1	0	0	0	0	0	0	0	0
#5	1	54	24	11	2	16	0	0	0	1	2
	2	25	38	18	6	6	0	0	0	0	0
	3	12	29	22	8	16	8	3	5	0	2
	4	19	15	6	11	14	5	9	7	2	2
	5	2	2	0	0	0	0	0	0	0	1
#6	1	9	8	9	3	16	5	2	2	3	2
	2	14	10	17	4	7	1	0	2	0	0
	3	12	9	10	3	5	5	0	4	1	0
	4	10	5	4	1	0	0	1	0	0	0
	5	0	0	0	0	0	0	0	0	0	0
#7	1	158	62	36	6	12	0	1	3	0	1
	2	103	75	44	10	17	2	1	0	0	1
	3	41	65	67	40	39	19	11	12	6	1
	4	48	38	27	25	46	18	16	21	15	6
	5	7	3	1	0	1	0	0	1	0	0

*1. Read completely; 2. Read in large part; 3. Read only abstract or summary; 4. Read only the title; 5. Do not even look at.

TABLE VIII

Question III-A

Modal Response by IEG

	IEG #	I		II		III		IV		V		VI		VII	
		NIH	WFH	NIH	WFH	NIH	WFH	NIH	WFH	NIH	WFH	NIH	WFH	NIH	WFH
1.	Read completely	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	50%	50%	10%	10%
2.	Read in large part	10%	10%	20%	20%	10%	10%	10%	30%	10%	20%	30%	30%	10%	10%
3.	Read only abstract or summary	20%	20%	30%	30%	30%	30%	50%	50%	20%	20%	10%	10%	30%	30%
4.	Read only title	20%		20%	10%	20%	10%	20%	20%	20%	10%	10%	10%	10%	10%
5.	Do not even look at	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Table IX

F.Q. Responses: The Problem of Unneeded Advance Information Question III-B

Persons	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	All Group
All Respondents, percent of membership	185 (24.9)	41 (32.3)	52 (30.4)	83 (27.9)	180 (29.5)	75 (30.0)	461 (31.3)	1075 (29.4
Answering Question III-B, percent of all Respondents	135 (73.0)	31 (75.6)	32 (61.5)	52 (62.7)	72 (40.0)	54 (72.0)	326 (70.7)	702 (65.3
Magnitude of the Problem*								
Check-list items / Persons answering	135 (100)	31 (100)	32 (100)	52 (100)	72 (100)	54 (100)	326 (100)	702 (100
"Screening them out is a burdensome chore."	10 (7.4)	4 (12.9)	1 (3.1)	-	5 (6.9)	2 (3.7)	46 (14.1)	68 (9.
"Screening them out is no problem."	125 (92.6)	27 (87.1)	31 (96.9)	52 (100)	67 (93.1)	52 (96.3)	280 (85.9)	634 (90.3
Some Possible Solutions*								
"All memos should be refereed to remove papers of poorer quality."	9 (6.7)	-	2 (6.2)	1 (1.0)	10 (13.9)	-	35 (10.7)	57 (8.1
"An abstract on the front cover would be helpful."	74 (54.8)	12 (38.7)	18 (56.2)	19 (36.5)	44 (61.1)	34 (62.9)	260 (79.7)	461 (65.7
"The group's research area is too broad. Fewer memos if the area were smaller."	21 (15.6)	-	5 (15.6)	3 (5.8)	16 (22.2)	-	86 (26.4)	131 (18.7

* Number in parentheses is percentage representing number immediately above.

TABLE X

QUESTION III-B

Choice

IEG	1	2	3	4	5	2, 4	2, 3, 4, 5	2, 5	1, 5	1, 3, 5	1, 3, 4, 5	4, 5	2, 4, 5	1, 4	1, 4, 5	2, 3	3, 4	1, 3, 4	2, 3, 4	1, 3	3, 4, 5	2, 3, 5	3, 5	# Respondents Answering Question III B
#1	5	69	1	10	3	49	-	3	-	-	-	3	11	2	1	3	1	-	3	-	-	-	-	164
#2	-	26	-	3	-	6	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	37
#3	1	24	-	6	1	10	-	2	-	-	-	3	-	-	-	-	1	-	1	-	-	-	-	49
#4	-	40	-	4	2	21	-	1	-	-	-	2	-	1	-	1	-	-	-	-	-	-	-	72
#5	1	47	4	14	7	57	-	7	2	-	1	5	9	-	-	3	3	-	4	1	1	1	-	167
#6	-	29	-	9	-	27	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	67
#7	10	105	2	51	9	140	1	13	5	3	2	18	30	10	9	2	8	2	5	3	1	2	2	433
All Groups	17	340	7	7	22	310	1	26	7	3	3	31	50	17	10	9	13	2	13	4	2	3	2	989

Table XII

F.Q. Responses: Use of Journals and Attitude toward Publication (Question IV)

Persons	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	All Groups
All Respondents, percent of membership	185 (24.9)	41 (32.3)	52 (30.4)	83 (27.9)	180 (29.5)	75 (30.0)	461 (31.3)	1075 (29.4)
Answering Question IV, percent of All Respondents	121 (65.4)	32 (78.0)	31 (59.6)	38 (45.8)	129 (71.7)	50 (66.7)	354 (76.8)	755 (70.2)
Responses*								
Person answering / Check-list items	121 (100)	32 (100)	31 (100)	38 (100)	129 (100)	50 (100)	354 (100)	755 (100)
"I no longer read the journals and have canceled subscriptions to some journals."	-	-	-	-	-	-	1	1
"I still read journals as before."	119 (98.3)	30 (93.8)	31 (100)	38 (100)	129 (100)	50 (100)	292 (82.5)	689 (91.3)
"I do not feel the necessity of journal publication if my papers have gone through IEG."	-	-	1 (3.2)	-	2 (1.6)	-	7 (2.0)	10 (1.3)
"I want my research papers published in a good journal regardless of IEG."	121 (100)	32 (100)	29 (93.5)	30 (78.9)	121 (93.8)	43 (86.0)	347 (98.0)	723 (95.8)
"I read journals but completely omit papers based on IEG memos."	22 (18.2)	4 (12.5)	3 (9.7)	7 (18.4)	18 (14.0)	11 (22.0)	101 (28.5)	166 (22.0)
"I look for articles previously circulated as IEG memos."	37 (30.6)	10 (33.3)	4 (12.9)	10 (26.3)	24 (18.6)	11 (22.0)	77 (21.8)	173 (22.9)

* Number in parenthesis is percentage representing number immediately above.

TABLE XIII

QUESTION IV

Choice

IEG	1	2	3	4	5	6	7	2, 5	4, 6	3, 6	2, 6	2, 4, 6	2, 3, 6	3, 4, 6	2, 3, 4, 6	3, 4	5, 6	2, 3	1, 6	4, 5	2, 4	1, 2, 5	3, 4, 5	# Respondents Answering Question IV
#1	-	5	1	23	-	11	4	73	6	10	6	-	25	-	6	-	-	-	-	-	-	-	-	170
#2	-	1	-	4	-	1	-	-	20	1	3	-	-	-	-	-	-	-	-	-	-	-	-	40
#3	-	-	1	11	-	3	1	-	25	2	2	-	2	1	-	-	-	-	1	2	-	-	-	51
#4	-	3	3	13	-	2	-	1	37	2	5	2	-	7	-	1	-	-	-	-	-	-	-	76
#5	-	6	-	25	1	0	-	-	85	2	12	-	2	20	-	1	1	-	-	-	3	-	-	167
#6	-	3	2	17	-	6	1	-	30	1	7	-	-	8	-	-	-	1	-	-	-	-	-	76
#7	-	16	2	41	-	20	5	2	192	10	68	11	5	59	3	7	1	-	1	-	-	1	1	445
All Groups	0	34	9	134	1	52	11	3	462	24	107	19	9	130	3	15	2	1	2	2	3	1	1	1,025

TABLE XVI (WFH)

Question VI

Category Schedule

A. Useful Service

1. For geographically remote
2. For easily obtaining "reprints"/reference file/literature search
   a. teaching aid, book and review writing aid
3. Establishing contact with other researchers/labs
4. For getting information quickly/current awareness
   a. overcomes journal lag-time
   b. overcomes journal scatter
   c. overcomes lack of journals in research area
5. Allows free expression
6. Supplements journals

B. Not a Useful Service

1. Just a preprint service
2. Should circulate more informal-type information/limit size of papers
3. Used to establish priority
4. Cost not worth it
   a. prefer journal subscription
   b. help existing journal system
   c. spend the money on research grants

TABLE XVI (WFH) - (Continued)

5. Has negative effect on existing journal system/helps flood the literature

   a. quality of material circulated a problem/referee

6. Group-size - too large (too small) too restrictive

TABLE XVII

Question VI

(# of IEG Response)

Response Category	1	2	3	4	5	6	7	All Groups
A	31	15	6	10	24	19	78	183
1	16	6	1	4	16	8	34	85
2	2	3	0	4	0	3	9	21
a	3	0	2	3	5	0	4	17
2A Total	5	3	2	7	5	3	13	38
3	7	2	0	0	4	3	32	48
4	22	12	0	15	24	18	60	151
a	4	3	2	2	1	3	8	23
b	9	5	0	5	8	7	22	56
c	0	1	0	0	0	0	0	1
4A Total	35	21	2	22	33	28	90	231
5	6	1	0	5	1	1	2	15
6	1	2	1	1	0	3	7	15
TOTAL A	101	50	12	49	83	65	256	616
B	1	1	8	2	15	1	15	43
1	1	4	0	1	2	0	6	14
2	33	8	5	10	41	4	51	152
3	5	0	0	0	4	2	10	21
4	2	1	3	0	1	1	19	27
a	0	0	1	0	0	0	0	1
b	2	1	2	0	0	1	2	8
c	0	0	0	1	0	0	12	13
4B Total	4	2	6	1	1	2	33	49
5	3	1	2	0	2	3	24	35
a	3	0	1	3	9	0	21	37
5B Total	6	1	3	3	11	3	45	72
6	7	4	3	7	19	1	34	75
TOTAL B	57	20	25	24	93	13	194	426